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Consumer Acceptance of Irradiated Meat and Poultry in the United States

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ABSTRACT

Food manufacturers in the United States are currently allowed to irradiate raw meat and poultry to control microbial pathogens and began marketing irradiated beef products in mid-2000. Consumers can reduce their risk of foodborne illness by substituting irradiated meat and poultry for nonirradiated products, particularly if they are more susceptible to foodborne illness. The objective of this study was to identify the individual characteristics associated with willingness to buy irradiated meat and poultry, with a focus on five risk factors for foodborne illness: unsafe food handling and consumption behavior, young and old age, and compromised immune status. A logistic regression model of willingness to buy irradiated meat or poultry was estimated using data from the 1998–1999 FoodNet Population Survey, a single-stage random-digit dialing telephone survey conducted in seven sites covering 11% of the U.S. population. Nearly one-half (49.8%) of the 10,780 adult respondents were willing to buy irradiated meat or poultry. After adjusting for other factors, consumer acceptance of these products was associated with male gender, greater education, higher household income, food irradiation knowledge, household exposure to raw meat and poultry, consumption of animal flesh, and geographic location. However, there was no difference in consumer acceptance by any of the foodborne illness risk factors. It is unclear why persons at increased risk of foodborne illness were not more willing to buy irradiated products, which could reduce the hazards they faced from handling or undercooking raw meat or poultry contaminated by microbial pathogens.

Foodborne illness remains an important cause of illness and death in the United States despite intensive efforts to keep food products from being contaminated by microbial pathogens. The Centers for Disease Control and Prevention has estimated that there are 76 million annual cases of foodborne illness, resulting in 325,000 hospitalizations and 5,000 deaths *(34)*. Pathogen-contaminated meat and poultry are thought to cause at least 2.5 million illnesses and 1,000 deaths every year *(20)*. Many of these illnesses occur when consumers prepare raw meat or poultry at home *(13, 26)*. Household surveys reveal that risky food handling and consumption behaviors are relatively common, including not washing one's hands after preparing raw meat and eating undercooked hamburgers *(1, 2, 28)*. One strategy to reduce foodborne illness is to educate consumers about the risks associated with handling and undercooking raw meat and poultry *(1)*. However, some persons are unwilling to forgo risky foods even when informed about the hazards *(9)*.

Foodborne illness could also be reduced by using food irradiation to reduce the prevalence of microbial pathogens in raw meat and poultry *(32)*. U.S. food manufacturers are currently permitted to irradiate raw meat and poultry (as well as certain other food products) in order to control microbial pathogens, using gamma rays, X-rays, or electron beams *(5)*. The maximum permitted radiation dose for meat (4.5 to 7.0 kGy) and poultry (3.0 kGy) is sufficient to inactivate at least 99.9% of common foodborne pathogens such as *Salmonella* and *Escherichia coli* O157:H7 *(43)*. The safety of irradiated food has been established by extensive research *(44)*. Consumers who substitute irradiated raw meat and poultry for nonirradiated products can reduce their risk of foodborne illness, and those at increased risk should experience the greatest health benefits. Persons at increased risk include individuals with risky food handling or consumption practices, as well as individuals who are more susceptible to foodborne pathogens or serious health problems due to foodborne infections because they are very young, old, pregnant, or immunocompromised *(22)*. These groups are likely to account for a disproportionate share of foodborne illnesses due to pathogen-contaminated meat and poultry.

Prior to May 2000, few grocery stores offered irradiated poultry, and none offered irradiated meat despite federal government approval of irradiation for raw pork in 1986, for raw poultry in 1992, and for all raw meats in February 2000 *(20)*. A Minnesota-based manufacturer began marketing irradiated frozen ground beef patties in the

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Minneapolis-St. Paul area in May 2000, and other firms have since introduced irradiated beef products in additional markets *(4, 24, 30, 35)*. The slow growth of the irradiated food market is due in part to uncertainty about consumer demand *(36)*. Some consumers are concerned about the safety of food irradiation, suggesting that demand might be low. For example, a 1993 national survey found that over 60% of adults were extremely concerned that irradiated foods might be radioactive or capable of causing cancer or birth defects *(3)*, while a 1997 national survey found that 69% of supermarket shoppers believed that irradiated foods posed a health risk *(16)*. Risk perception studies indicate that the public views food irradiation as moderately or highly risky, because irradiation technology is unfamiliar and radiation provokes feelings of dread *(40, 41)*.

Other evidence indicates that there might be substantial demand for irradiated food despite consumer safety concerns. National surveys have found that 36 to 79% of respondents are willing to buy irradiated food, depending on the question wording and the year when the survey was conducted *(17, 18, 33, 38)*. Supermarket trials have shown that many consumers will buy irradiated chicken when it is priced the same as nonirradiated chicken *(19)*. Some consumers are now buying irradiated beef that is priced higher than nonirradiated beef, revealing that they will pay a premium for safer meat *(29)*.

Only 53% of supermarket shoppers were aware of food irradiation in 1996 *(15)*. Previous studies based on mail and telephone surveys have reported conflicting evidence about the effect of food irradiation knowledge on consumer attitudes toward irradiated food *(6, 31, 33, 37)*. In contrast, market simulation experiments have found that the proportion of consumers buying irradiated meat and poultry increased after the study participants received additional information about food irradiation *(3, 23)*. These findings suggest that targeted educational messages about food irradiation could increase consumer acceptance of irradiated food *(7, 8)*.

The future impact of irradiated meat and poultry on the incidence of foodborne illness will depend on the characteristics of consumers who buy irradiated products, as well as the proportion of meat and poultry that is irradiated. Foodborne illness due to pathogen-contaminated meat and poultry could be reduced if consumers at increased risk of foodborne illness substituted irradiated for nonirradiated products. This study used information from a recent survey to investigate consumer willingness to buy irradiated meat or poultry, particularly among individuals at increased risk for foodborne illness.

MATERIALS AND METHODS

Data source. Information about consumer willingness to buy irradiated meat and poultry was obtained from the 1998–1999 Population Survey conducted by the Foodborne Diseases Active Surveillance Network (FoodNet). FoodNet is the primary foodborne disease component of the Centers for Disease Control and Prevention's Emerging Infections Program, operated in collaboration with the U.S. Department of Agriculture, the Food and Drug Administration, and nine state health departments *(11)*. In addition to other activities, FoodNet conducts a periodic telephone survey of residents of the participating Emerging Infections Program sites. The 1998 to 1999 Population Survey was carried out from February 1998 through February 1999 in seven Emerging Infections Program sites (Connecticut, Georgia, Minnesota, Oregon, and selected counties in California, Maryland, and New York) covering 11% of the U.S. population. The participating Emerging Infections Program sites were not selected to provide a representative sample of the U.S. population but are located in different regions and cover both urban and rural areas. The topics investigated by the survey include health status, food handling and consumption practices, and knowledge and attitudes regarding irradiated food. Most of the questions from this survey are reported in the 1998–1999 Population Survey Atlas of Exposures *(12)*.

The 1998–1999 Population Survey was administered by MACRO International using standard Behavioral Risk Factor Surveillance System methodology *(10)*. Sample households were selected using a single-stage random-digit dialing technique, and one respondent was randomly selected from each household. Persons who did not speak English were excluded. Approximately the same number of interviews were conducted each month in each site. The survey results were weighted to account for unequal probabilities of selection due to varying numbers of persons and residential telephone numbers per household, and were poststratified to provide estimates of each site population by gender and age. This study was restricted to the 10,780 adult respondents aged 18 or older.

The survey results were used to construct measures of willingness to buy irradiated meat or poultry and individual characteristics that might influence acceptance of irradiated food, including risky food handling and consumption practices and susceptibility to foodborne pathogens. Previous studies have identified several factors related to consumer willingness to buy irradiated food, including age, gender, education, and income *(6, 31, 33, 38)*. Except for age, however, consumer characteristics associated with an increased risk of foodborne illness were not examined. Earlier studies did not find a consistent relationship between age and willingness to buy irradiated food *(31, 33, 38)*.

Dependent variable. The first survey question about food irradiation asked, "Have you ever heard of food irradiation as a process for treating food?" All respondents were then informed that "irradiation is a process that reduces the number of bacteria and other microorganisms that might cause illness in improperly prepared foods" before being asked "Would you buy irradiated meat or poultry if it was available where you shop?" A dichotomous measure of consumer acceptance of irradiated meat and poultry was created from the responses to this question by classifying respondents into two groups: persons who answered yes, and persons who answered no or were unsure. Only 11 respondents (0.1%) refused to answer and were dropped from the analysis. Because few grocery stores sold irradiated poultry and none sold irradiated meat at the time of the survey, the question about buying irradiated products was necessarily hypothetical for most or all respondents. Similar questions are routinely used to assess consumer demand for new products *(14)*.

Risk factors for foodborne illness. A summary measure of risky food handling was created from two survey questions about how respondents generally prepared meat or poultry *(12)*. Respondents were classified as risky food handlers if they did not usually wash their hands with soap after handling raw meat or poultry or did not usually wash their cutting board with soap or bleach after cutting raw meat or poultry. Previous surveys have

found that up to one-third of respondents did not adequately wash their hands or cutting boards after preparing raw meat or poultry *(1, 2, 28).*

A measure of risky food consumption was derived from questions about meat and poultry items eaten during the week before the survey interview *(12).* The questions asked about 3 types of meat (hamburger, other ground beef, and ground pork) and 11 types of poultry (ground and baked chicken and turkey; broiled, rotisserie, grilled, fried, and stir-fried chicken; and chicken wings and nuggets). Respondents were classified as having eaten risky food if any of these items were pink on the inside when eaten. Pinkness is not an infallible guide to whether hamburgers have been undercooked *(42).* However, two case-control studies have provided evidence that eating pink meat or poultry is a valid measure of risky food consumption. One study found that eating pink hamburger or ground beef was significantly associated with sporadic *E. coli* O157:H7 infections *(27),* while the other study found that eating pink chicken or turkey was significantly associated with sporadic *Campylobacter* infections *(21).*

Three susceptible subpopulations were identified: children under age 5, the elderly, and the immunocompromised. The child subpopulation was identified at the household level because adult household members are normally responsible for feeding young children. Information about household composition was used to classify respondents by whether there were any children under age 5 in their household. The elderly were defined as persons aged 60 or older. Immunocompromised persons were identified based on three questions about health status and medical care *(12).* Respondents were classified as immunocompromised if they took prednisone, other steroids, or cyclosporine; received chemotherapy or radiation treatments that suppressed the immune system during the 4 weeks before the survey interview; or else had a health condition such as cancer or AIDS that impaired the immune system. A fourth susceptible subpopulation, pregnant women, could not be identified due to data limitations.

Other consumer characteristics. The analysis included nine measures of other consumer characteristics expected to influence willingness to buy irradiated meat or poultry independently of the foodborne illness risk factors. Gender (male or female), education (some college or ≤high school graduate), and annual household income (less than $30,000, $30,000+, or unknown) were included because males, more educated persons, and persons with higher incomes are more willing to buy irradiated food *(6, 31, 33, 38).* Income was treated as a categorical variable to retain the large number of respondents who did not report income (n = 2,095, 19.4%) in the analysis. Level of urbanization was included because nonmetropolitan residents are reported to be more likely than metropolitan residents to think that irradiated food is safe *(37),* suggesting that they may be more willing to buy irradiated products. Respondents were classified as nonmetropolitan if they described their place of residence as a town, village, or rural area, and as metropolitan if they described it as a city, urban, or suburban area. A separate measure identified the FoodNet site. A measure of food irradiation knowledge (ever heard or never heard) was also included based on the first question about food irradiation.

Two variables measured how often individuals were exposed to raw meat or poultry at home, possibly affecting their concern about the safety of these foods and their willingness to buy safer, irradiated products. Household exposure was assessed directly by whether individuals prepared raw meat or poultry at home based on the two questions about how meat or poultry was generally prepared, which identified persons who handled or cut raw meat or poultry in the kitchen. Household exposure was also assessed indirectly by frequency of restaurant meals, because persons who ate frequently in restaurants were likely to be less exposed to raw meat or poultry at home than other adults. The frequency of restaurant meals was determined by two questions about the number of restaurant meals during the week before the survey *(12),* which allowed respondents to be classified into three categories (0 meals, 1 to 3 meals, or 4+ meals).

The final variable measured whether persons ate animal flesh. Persons who did not eat animal flesh were unlikely to purchase much meat or poultry and were expected to be less willing to buy irradiated products. Consumption of animal flesh was assessed by questions asking whether respondents ate any of 17 types of poultry, 14 types of meat, or 14 types of wild game during the previous week *(12).* Respondents who ate none of these foods were classified as eating little or no animal flesh, while those who ate one or more types were classified as eating some animal flesh.

Data analysis. The bivariate relationships between willingness to buy irradiated meat or poultry and each individual characteristic were examined first to determine which consumers were most receptive to these products, using χ^2 as a test of significance. A binomial logistic regression model was then estimated to assess the effect of each characteristic on consumer acceptance of irradiated products while statistically controlling for all other characteristics *(25).* This simple logistic model was preferred, because the dependent variable was dichotomous and knowledge about the factors influencing consumer perceptions of irradiated products was too limited to specify a more complex model. The effect of each characteristic was measured by the adjusted odds ratio, which represents the impact of a one category increase in the characteristic on the predicted odds that a consumer is willing to buy irradiated products while holding other characteristics constant. The χ^2 tests and logistic model were estimated using the SUDAAN version 7.5 software package *(39)* to account for the complex survey sampling design. Standard errors of estimates and 95% confidence intervals for adjusted odds ratios are also reported.

RESULTS

An estimated 50% of adults in the FoodNet sites were willing to buy irradiated meat or poultry (Table 1). Only 48% had heard of food irradiation, so a majority were uninformed about irradiated food products. Many persons were at increased risk of foodborne illness. Nearly 24% were risky food handlers, 13% had eaten risky food items during the week before the survey, 21% were elderly, 6% were immunocompromised, and 22% had susceptible young children at home. Overall, 65% (SE of estimate = 0.6%) of FoodNet site residents were classified in one or more of the five risk groups for foodborne illness.

Bivariate analysis. There were small but significant differences in willingness to buy irradiated meat or poultry by most of the individual characteristics included in the analysis (Table 1). Persons at increased risk of foodborne illness did not have consistent attitudes toward irradiated products. Risky food handlers were more willing to buy irradiated meat or poultry than other adults, but the elderly were less willing. There was no difference in consumer acceptance by risky food consumption, the presence of young children, or immune status.

Other groups who were more willing to buy irradiated meat or poultry included males, persons with some college education, persons with household incomes of $30,000 or

TABLE 1. *Population estimates[a] of consumer characteristics and willingness to buy irradiated meat or poultry: FoodNet sites, 1998 to 1999*

Consumer characteristic	Sample size (*n*)	Population distribution[b]		Willing to buy irradiated meat or poultry		
		%	(SEE)[c]	%	(SEE)[c]	*P*[d]
All adults age 18+	10,767	100.0		49.6	(0.7)	
Risky food handler						
Yes	2,499	23.9	(0.6)	54.4	(1.4)	
No	7,969	76.1	(0.6)	48.6	(0.8)	0.000
Ate risky food						
Yes	1,314	12.7	(0.5)	51.3	(2.0)	
No	9,038	87.3	(0.5)	49.9	(0.7)	0.523
Child under age 5 in household						
Yes	1,237	21.6	(0.7)	47.0	(1.8)	
No	9,504	78.4	(0.7)	50.3	(0.7)	0.094
Elderly						
Yes (60+ years)	2,431	20.8	(0.5)	44.3	(1.3)	
No (18 to 59 years)	8,349	79.2	(0.5)	51.0	(0.8)	0.000
Immunocompromised						
Yes	683	6.0	(0.3)	49.7	(2.6)	
No	10,004	94.0	(0.3)	49.7	(0.7)	0.990
Sex						
Male	4,584	48.4	(0.7)	54.1	(1.0)	
Female	6,196	51.6	(0.7)	45.4	(0.9)	0.000
Education						
≤High school graduate	3,891	39.3	(0.7)	44.2	(1.1)	
Any college	6,824	60.7	(0.7)	53.2	(0.8)	0.000
Household income						
<$30,000	3,237	28.5	(0.6)	45.5	(1.3)	
$30,000+	5,448	51.3	(0.7)	56.4	(0.9)	
Not reported	2,095	20.1	(0.6)	37.9	(1.5)	0.000
Level of urbanization						
Metropolitan	7,388	67.3	(0.6)	50.4	(0.8)	
Nonmetropolitan	3,352	32.7	(0.6)	48.1	(1.2)	0.109
Knowledge of food irradiation						
Ever heard of it	5,455	48.3	(0.7)	53.6	(0.9)	
Never heard of it	5,319	51.6	(0.7)	45.9	(1.0)	0.000
Prepared raw meat or poultry						
Yes	9,748	90.9	(0.4)	50.7	(0.7)	
No	972	9.1	(0.4)	40.9	(2.2)	0.000
Restaurant meals						
0 meals	1,795	16.2	(0.5)	39.2	(1.6)	
1 to 3 meals	5,309	48.5	(0.7)	50.1	(1.0)	
4+ meals	3,582	35.4	(0.7)	54.3	(1.2)	0.000
Ate animal flesh						
Little or none	375	2.9	(0.2)	20.0	(2.8)	
Some	10,300	97.1	(0.2)	50.5	(0.7)	0.000
FoodNet site[e]						
California	1,591	22.7	(0.6)	49.8	(1.6)	
Connecticut	1,528	11.4	(0.7)	46.9	(1.5)	
Georgia	1,527	26.0	(0.6)	49.3	(1.6)	
Maryland	1,535	8.5	(0.7)	46.3	(1.6)	
Minnesota	1,518	16.0	(0.7)	53.2	(1.5)	
New York	1,505	3.8	(0.8)	50.8	(1.6)	
Oregon	1,576	11.4	(0.7)	49.7	(1.6)	0.039

[a] Weighted estimates for respondents with information on specified characteristics.
[b] Percentages within each category may not sum to 100.0 due to rounding.
[c] SEE, standard error of estimate.
[d] *P* of χ^2 test.
[e] The FoodNet sites covered the entire state in Connecticut, Georgia, Minnesota, and Oregon. The California site included Alameda, Contra Costa, Marin, San Francisco, San Mateo, Solano, and Sonoma counties. The Maryland site included Anne Arundel, Baltimore, Baltimore City, and Howard counties. The New York site included Genesee, Livingston, Monroe, Ontario, Orleans, and Wayne counties.

more, and persons who had heard of food irradiation. Individuals who prepared raw meat or poultry at home and persons who ate some animal flesh were also more willing to buy irradiated products. In contrast, individuals who had not recently eaten in a restaurant were less willing to buy irradiated products, although they were presumably more exposed to raw meat or poultry at home than persons who dined out. Consumer acceptance of irradiated products varied slightly among the FoodNet sites and was highest in Minnesota (where irradiated beef was first introduced in grocery stores) and lowest in the Connecticut and Maryland sites.

Logistic regression model. The logistic regression of willingness to buy irradiated meat or poultry is reported in Table 2. After controlling for other individual characteristics, there was no significant difference in consumer acceptance of irradiated products by risky food handling or consumption practices, advanced age, compromised immune status, or the presence of young children in the home. Willingness to buy irradiated products was therefore unrelated to factors that increased an individual's risk of foodborne illness.

There were significant differences in willingness to buy irradiated products by other individual characteristics. Males, more educated persons, and persons with high household incomes were all more willing to buy irradiated products than other adults. In contrast, individuals who did not report income were less willing to buy irradiated products than those with low incomes (the reference category). Because income nonreporters could not be classified by income, it was unclear whether there was a linear relationship between income and consumer acceptance.

Individuals who had previously heard of food irradiation were more willing to buy irradiated meat or poultry than those who were unfamiliar with this technology. Consumer acceptance also varied by household exposure to raw meat or poultry. Individuals who prepared raw meat or poultry at home were more willing to buy irradiated products than other adults, who were less likely to be exposed to raw meat or poultry. Individuals who recently ate in restaurants were also more willing to buy irradiated products than other persons, even though dining out was presumably associated with lower household exposure to raw meat and poultry. The effect of restaurant dining on consumer acceptance was unrelated to the frequency of restaurant meals. In contrast, individuals who ate little or no animal flesh were less willing to buy irradiated products than other persons, as expected.

There was no significant difference in willingness to buy irradiated meat or poultry by level of urbanization. However, residents of three FoodNet sites (California, Connecticut, and Maryland) were less willing to buy irradiated products than residents of the Minnesota site (the reference category).

TABLE 2. *Logistic regression model of willingness to buy irradiated meat or poultry: FoodNet sites, 1998 to 1999*[a]

	Adjusted odds ratio	95% confidence interval	*P*
Intercept	0.64	0.48, 0.86	0.003
Risky food handler			
Yes	1.07	0.93, 1.23	0.348
No	(Reference)		
Ate risky food			
Yes	0.88	0.74, 1.06	0.173
No	(Reference)		
Child under age 5 in household			
Yes	0.88	0.75, 1.04	0.142
No	(Reference)		
Elderly			
Yes (60+ years)	0.91	0.79, 1.04	0.166
No (18 to 59 years)	(Reference)		
Immunocompromised			
Yes	1.04	0.83, 1.30	0.752
No	(Reference)		
Sex			
Male	1.32	1.18, 1.49	0.000
Female	(Reference)		
Education			
≤High school graduate	(Reference)		
Any college	1.21	1.07, 1.37	0.003
Household income			
<$30,000	(Reference)		
$30,000+	1.32	1.15, 1.51	0.000
Not reported	0.75	0.63, 0.89	0.001
Level of urbanization			
Metropolitan	(Reference)		
Nonmetropolitan	1.07	0.94, 1.21	0.307
Knowledge of food irradiation			
Ever heard of it	1.20	1.07, 1.35	0.003
Never heard of it	(Reference)		
Prepared raw meat or poultry			
Yes	1.29	1.03, 1.61	0.026
No	(Reference)		
Restaurant meals			
0 meals	0.73	0.62, 0.85	0.000
1 to 3 meals	(Reference)		
4+ meals	1.07	0.94, 1.22	0.281
Ate animal flesh			
Little or none	0.29	0.20, 0.43	0.000
Some	(Reference)		
FoodNet site[b]			
California	0.81	0.67, 0.98	0.031
Connecticut	0.78	0.64, 0.93	0.007
Georgia	0.94	0.78, 1.13	0.513
Maryland	0.77	0.64, 0.94	0.009
Minnesota	(Reference)		
New York	0.97	0.81, 1.17	0.766
Oregon	0.89	0.74, 1.07	0.234
Pseudo R^2	0.066		

[a] n = 9,767 cases with complete information on all variables in model.

[b] See Table 1 for definition of FoodNet sites.

DISCUSSION

Food irradiation is an important option for reducing the incidence of foodborne illness caused by microbial patho-

gens that may contaminate raw meat or poultry. The efficacy of this technology does not depend on reducing risky food handling or consumption practices by individual consumers. Irradiated beef began appearing in retail food stores in mid-2000, but consumer demand is uncertain. This study found that 50% of adults in the FoodNet sites were willing to buy irradiated meat or poultry (Table 1). A national survey during the same period found that 55 to 56% of supermarket shoppers were likely to buy irradiated food products *(17),* so consumer perceptions of irradiated food did not differ substantially between the FoodNet sites and other areas of the country.

Willingness to buy irradiated meat or poultry varied by most of the individual characteristics included in the analysis (Table 1). However, the logistic regression model revealed that there was no difference in consumer acceptance of irradiated products by any of the risk factors for foodborne illness once other characteristics were controlled (Table 2). It is unclear why persons at increased risk of foodborne illness were not more willing to buy irradiated meat or poultry. They may have been unaware of their increased risk or else unaware that irradiated food could reduce their risk. More research is needed to determine why these persons did not find irradiated products more appealing. Depending on the findings, appropriate public health messages could be designed to inform persons at increased risk of foodborne illness about behavior changes (including substituting irradiated meat and poultry for nonirradiated products) that could reduce their risk.

The logistic regression model indicated that consumer acceptance of irradiated products was related to other individual characteristics, including gender, education, income, knowledge of food irradiation, FoodNet site, household exposure to raw meat and poultry, and consumption of animal flesh (Table 2). From a public health perspective, awareness of food irradiation was the most important characteristic associated with greater willingness to buy irradiated products. This relationship was consistent with market simulation experiments indicating that information about food irradiation made consumers more willing to buy irradiated meat *(3, 23).* The effect of food irradiation knowledge was independent of other characteristics, including education, and implied that higher public awareness of food irradiation would increase consumer acceptance of irradiated products.

Other persons who were more willing to buy irradiated products included males, more educated persons, and individuals with higher incomes, confirming the results from earlier studies *(6, 31, 33, 38).* The effect of household exposure to raw meat and poultry depended on how exposure was assessed. Individuals who prepared raw meat or poultry at home and individuals who ate in restaurants were both more willing to buy irradiated products, although dining out presumably reduced exposure to raw meat and poultry. The unexpected effect of restaurant dining might reflect other factors. For example, restaurant patrons might be more concerned about food safety or more receptive to new food products than other persons.

Consumer acceptance of irradiated meat and poultry will ultimately be decided in the marketplace if food manufacturers continue to introduce new irradiated products and food retailers agree to carry these products. The survey data examined in this study provide only suggestive evidence about who will actually buy irradiated meat and poultry, because questions about hypothetical purchase decisions may not reflect actual market behavior. One aspect of market behavior that was not considered here was the cost of irradiated products. Irradiated meat and poultry cost more per pound than comparable nonirradiated products, and supermarket trials have demonstrated that consumers are sensitive to the price of irradiated food *(19, 20).* Other study limitations include the exclusion of households without telephones and individuals who did not speak English from the survey sample. Despite these limitations, the evidence from the FoodNet sites indicates that persons at increased risk of foodborne illness were not especially willing to buy irradiated meat or poultry, despite the potential hazards they faced from handling or undercooking raw meat or poultry contaminated by microbial pathogens.

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